Space Weather Forecast

Issued on Wednesday, 08 May 2024 at 13:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further Strong flares (R3 -Strong radio blackouts) throughout. Chance of G2-G3/Moderate-Strong geomagnetic storm conditions on 10 May.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is High. Two large and complex sunspot regions in the northwest and southwest of the visible disc have produced frequent Moderate flares during the period as well as a single Strong flare apiece. The region in the northwest is approaching the western limb, making analysis of its magnetic structure difficult. It appears to retain a complex and unstable magnetic configuration, although has seen a recent slight decline in overall size. The region in the southwest remains by far the largest region on the disc and comprises a number of strong spots along with a very complex magnetic structure. The region lies in close proximity to another, much smaller region to the east, with which it is magnetically connected. The remaining sunspots on the disc are smaller, stable and magnetically simple.

A 'full-halo' Coronal Mass Ejection (CME) associated with the long-period Strong flare from the southwest sunspot at 08/0509 UTC is still being analysed, but initial output suggests an arrival time late on Day 3 (10 May).

Solar Wind / Geomagnetic Activity: Solar winds declined from elevated to slightly elevated levels through the period as the connection ot the fast wind of a coronal hole continued to ease. Speeds peaked at 555km/s at 07/1713 UTC. The Interplanetary Magnetic Field was at weak levels throughout with the important north-south component also varying weakly. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: Solar radiation was at normal background levels although indicated a minor response following the Strong flare from the southwest sunspot region at 08/0509 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: High solar activity is forecast with frequent Moderate flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the northwest and southwest of the visible disc.

Solar Wind / Geomagnetic Activity: There are several potential Earth-directed CMEs in the forecast period. There is a slight chance for a couple of glancing impacts early on Day 2 (09 May) and also on Day 3 (10 May). A more significant CME is expected to arrive Day 3 (10 May), resulting from the Strong flare of the sunspot region in the southwest disc that occurred early on 08 May. Earth is under the influence of a slowly declining fast solar wind from a coronal hole, with slightly elevated solar winds expected to fall to background levels by Day 3 (10 May). No further coronal hole enhancements are expected during the period.

Geomagnetic activity probably mostly remaining Quiet to Unsettled through the early guidance period, with a slight chance of Minor Storm (Kp5) intervals on Days 1 and 2 (08 and 09 May). Pending the forecast 'full-halo' CME arrival on Day 3 (10 May), activity should increase to G1-

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G2/Minor-Moderate Storm levels and a chance of peak G3/Strong Storm conditions, with activity projected to decline into Day 4 (11 May).

Energetic Particles / Solar Radiation: Solar radiation levels are most likely to remain at background levels through the period. There is an ongoing chance for a Minor Storm or greater event occurring, from the two large sunspot groups in the western hemisphere of the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	80	80
Strong	G3	No	1	1	20	20
Severe	G4	No	1	1	5	5
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	95	95	90	90
Very Active	R3 to R5 X	Yes	45	45	30	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	30	30	30	25
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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